Verification of neutron-gamma calculations by means of TLD-measurements in iron, water and air

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Considering the new interest in gamma fluence spectra due to possible gamma radiation damage of pressure vessels, new neutron-gamma experiments have been realized. As complement to spectrum measurements with NE-213 and high-purity Ge detectors, absolute integral meaurements with different types of Li:Mg,Ti thermoluminescence dosimeters (TLD) were performed at the experimental channel of the Zittau Training and Research Reactor at different depths of water, iron and air layers. Due to small dimensions of the TLDs, these measurements allowed a much better spatial resolution and smaller perturbations of the measured gamma and neutron radiation field than the spectrum measurements. To check available codes and nuclear data, Monte Carlo calculations were obtained for the measurement points with different nuclear data files and compared with the measured TLD-responses. The reasons of discrepancies are discussed.

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